(12) UK Patent Application (19) GB (11) 2 211 338 (13) A

(43) Date of A publication 28.06.1989

(21) Application No 8823820.9

(22) Date of filing 11.10.1988

(30) Priority data
(31) 1502487 (32) 22.10.1987 (33) AU

(51) INT CL⁴
G07F 17/34

(52) UK CL (Edition J)
G4V VAA V118
U1S S1174

(56) Documents cited
GB 2131587 A

(58) Field of search
UK CL (Edition J) G4V
INT CL⁴ A63F, G07F

(71) Applicant
Ainsworth Nominees Pty Limited

(Incorporated in Australia - New South Wales)

85-113 Dunning Avenue, Rosebery, New South Wales, Australia

(72) Inventors
Daniel Alan Tracy
Richard Edward Smyth

(74) Agent and/or Address for Service
G F Redfern & Company
High Holborn House, 52/54 High Holborn, London, WC1V 6RL, United Kingdom

(54) Gaming machine

(57) A poker machine or slot machine in which the symbols or indicia to be displayed are selected by using a random number generator to generate a random number for each display position, the random number being selected from a range corresponding to the number of display possibilites for that position. The random numbers are then compared with one of two look-up tables A & B to select the actual symbol or indicia to be displayed. Each of the two look-up tables has a different symbol sequence and gives the player a different probability of winning than the other, one being greater than and the other being less than the target return for the machine, and the machine monitors the overall rate of return to players and switches between the two look-up tables in order to maintain the overall rate of return within tolerable limits around the target return for the machine.

TABLE A

RANDOM No	REEL 1	REEL 2	REEL 3	REEL 4
1	A	A	A	A
2	K	8	10	J
3	7	7	8	K
4	K	8	10	J
5	8	K	J	Q
6	Q	8	10	J
7	10	10	7	8
8	K	8	10	J
9	9	9	8	Q
10	7	10	10	J
11	9	K	Q	10
12	K	8	7	
13	10			
		8	7	K
21	9	J	Q	8
22	K	9	7	10
23	7	8	10	J
24	K	10	K	Q
25	9	8	10	J

80%

TABLE B

RANDOM No	REEL 1	REEL 2	REEL 3	REEL 4
1	9	A	9	A
2	K	8	10	J
3	9	7	8	K
4	K	8	10	J
5	8	K	J	Q
6	9	8	10	J
7	10	10	7	8
8	K	8	10	J
9	9	9	8	Q
10	10	10	10	J
11	7	8	K	
12				
			Q	K
19	10	10	7	Q
20	K	8	10	J
21	Q	J	Q	8
22	K	9	7	10
23	9	8	10	J
24	K	10	K	Q
25	9	8	10	J

90%

FIG. 1

GB 2 211 338 A

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

2211338

TABLE A

RANDOM No	REEL 1	REEL 2	REEL 3	REEL 4
1	A	A	A	A
2	K	8	10	J
3	7	7	8	K
4	K	8	10	J
5	8	K	J	Q
6	Q	8	10	J
7	10	10	7	8
8	K	8	10	J
9	9	9	8	Q
10	7	10	10	J
11	9	K	Q	10
12	K	8	7	J
13	10	8	7	K
21	9	J	Q	8
22	K	9	7	10
23	7	8	10	J
24	K	10	K	Q
25	9	8	10	J

80%

TABLE B

RANDOM No	REEL 1	REEL 2	REEL 3	REEL 4
1	9	A	9	A
2	K	8	10	J
3	9	7	8	K
4	K	8	10	J
5	8	K	J	Q
6	9	8	10	J
7	10	10	7	8
8	K	8	10	J
9	9	9	8	Q
10	10	10	10	J
11	7	8	K	K
12	10	10	7	Q
20	K	8	10	J
21	Q	J	Q	8
22	K	9	7	10
23	9	8	10	J
24	K	10	K	Q
25	9	8	10	J

90%

FIG. 1

2211338

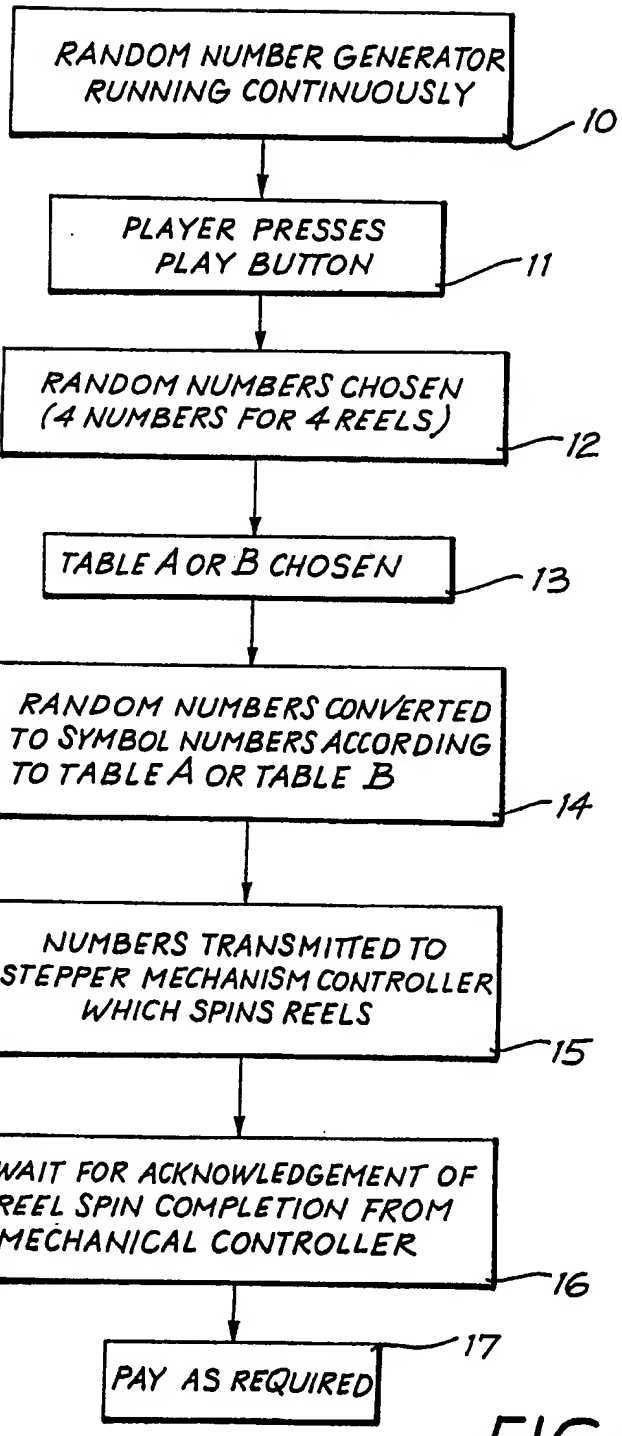

FIG.2

2211338

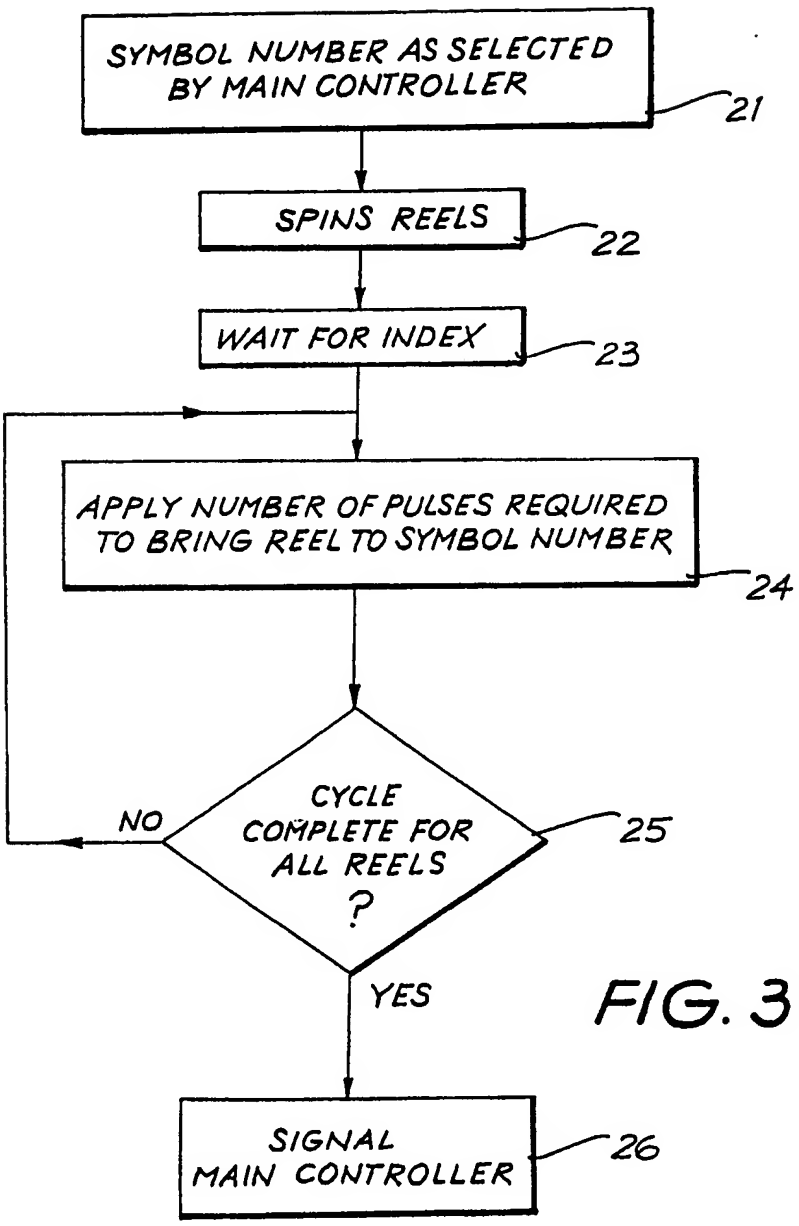

FIG. 3

2211338

1	A
2	10
3	K
4	J
5	8
6	J
7	K
8	Q
9	8
10	9
11	Q
12	7
13	J
14	10
15	K
16	9
17	Q
18	8
19	7
20	K
21	9
22	J
23	7
24	J
25	Q ← INDEX POSITION

FIG. 4

2211338

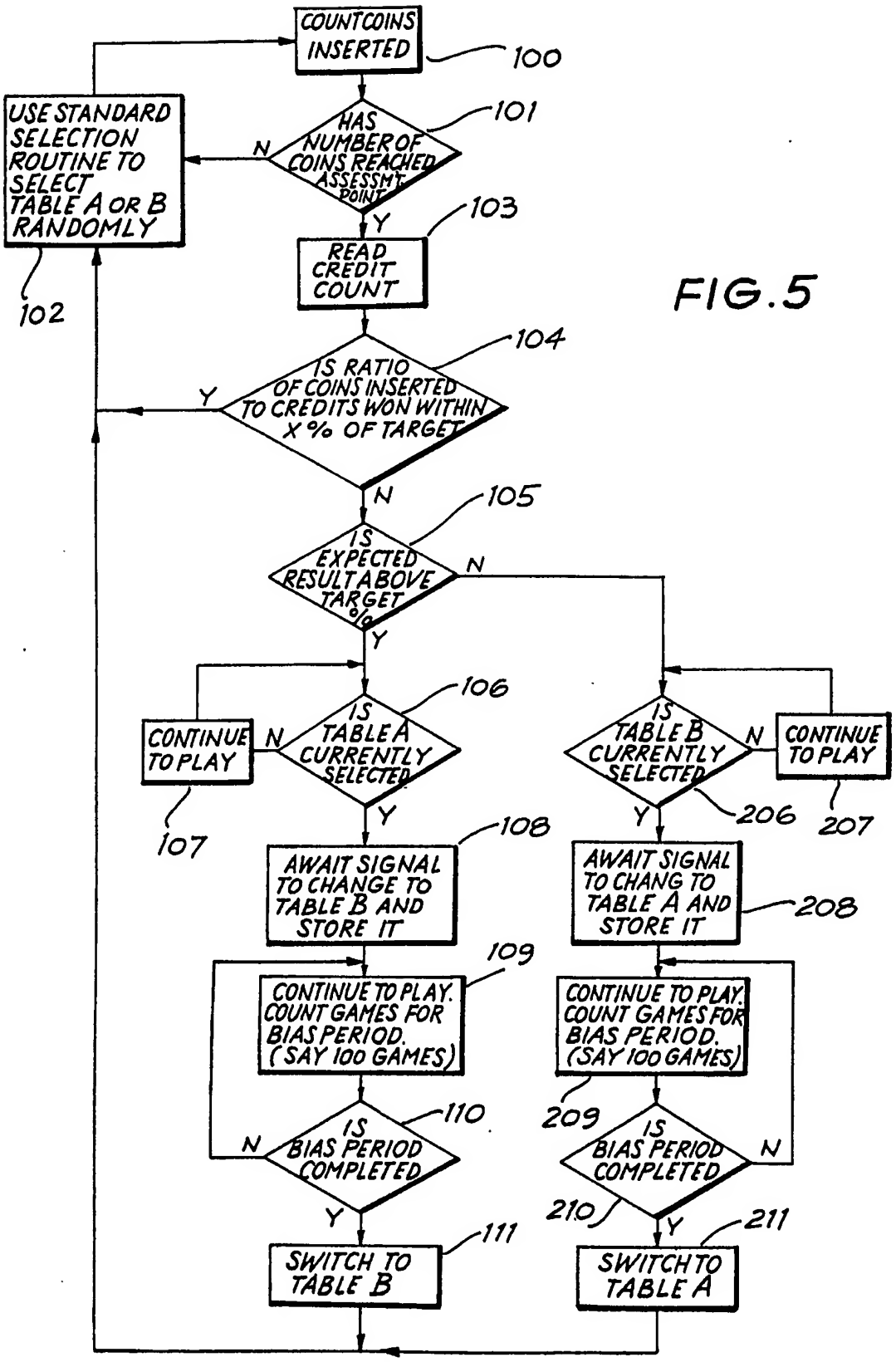

FIG.5

2211338

POKER MACHINE

The present invention relates generally to poker machines, otherwise known as fruit machines or slot machines, and in particular the invention provides an improved poker machine wherein the dividend returned to the operator is maintained within close limits by periodically adjusting the payout characteristics of the machine.

The present invention consists in a poker machine having display means arranged to simultaneously display a plurality of indicia selected from a set of possible indicia, the selected indicia representing a result of a game on said poker machine, the machine including random number generating means to produce one or more random or pseudo-random numbers and table look-up means arranged to look up a result table which maps said one or more random numbers to a selection from the set of indicia, the poker machine being characterised in that two result tables are provided, a first of said tables providing a set of possible results which give a theoretical return to the operator which is less than a predetermined target return of the machine and a second of the tables providing a set of possible results which give a theoretical return to the operator which is greater than said target return, and selection means being provided to periodically select one or other of the tables to be assessed by the table look-up means to maintain the actual return to the user within close limits about the target return.

A preferred embodiment of the invention provides a poker machine having display means arranged to simultaneously display a plurality of indicia selected from a set of possible indicia and random selection means arranged to select the indicia to be displayed on said display means from said set of indicia, the random selection means including random number generation means arranged to produce one random number for each indicia

display position in the display means, a first look up table defining a first set of displayable indicia for each indicia display position, each indicia in the first table being associated with a respective random number within the range of random numbers able to be produced by the random number generator means, a second look up table defining a set of displayable indicia for each indicia display position and each indicia of the second look-up table also being associated with a respective one of the possible numbers produced by the random number generator means, dividend monitoring means to continuously track the dividend returned to an oprator of the machine, and selection means arranged to select between the first and second look-up tables as the table to be used for a given game on the machine the first and second look up tables each producing different theoretical returns to the operator respectively higher and lower than a predetermined target return and the selection means being responsive to the dividend monitoring means to periodically select the first or second table in order to maintain the monitored dividend return with predefined limits about the target return.

An embodiment of the present invention will now be described by way of example with reference to the accompanying drawings in which:-

Figure 1 illustrates first and second look-up tables for looking up reel symbols to be displayed for a given random number, or result, produced by a random number generator;

Figure 2 provides a flow chart for the main controller of a poker machine according to the present invention;

Figure 3 illustrates a flow chart for a display mechanism controller of the preferred embodiment; and

Figure 4 schematically illustrates a reel strip for a

first reel of a poker machine according to the present invention.

Figure 5 illustrates a flow chart for a return and dividend adjustment routine which keeps short term returns and dividends within well defined limits.

Referring to Figure 2, in a poker machine according to the present invention a random number generator 10 is continuously operational while the poker machine is running, such that when a player operates the game starting switch 11, a set of random numbers are chosen 12, with one number being chosen for each reel of the machine. It will be noted that in the preferred embodiment of the invention the poker machine display is provided by a plurality of stepper motor driven reels each carrying a strip of indicia such that rotation and subsequent stopping of the reel leaves one of the indicia positioned in a window, this indicia being one of the selection of indicia which are used to determine the game result. First and second result tables (tables A and B in Figure 1) are to be used to determine the reel symbols to be displayed and these tables are indexed by the random numbers chosen for the particular game. Only one table is used in any one game and the table to be used can be chosen 13 on a game by game basis or may be chosen periodically and used for a number of games. Having chosen a table, the random numbers generated by the random number generator are then converted 14 to symbol codes in accordance with the selected one of tables A and B of Figure 1 and the symbol codes are then transmitted 15 to the stepper mechanism controller which controls the spinning of the reels. The main machine controller then waits for acknowledgement 16 that the spinning of the reels has been completed and then proceeds to make a pay 17, if required by the occurrence of a winning combination of reel positions.

Referring now to Figure 3, the reel mechanism controller receives 21 the symbol codes selected by the main controller, commences spinning of the reels 22 by initiating stepping of the respective stepping motors, waits for the index position of each reel to pass the datum point 23 and then applies to each reel the number of pulses required to bring the reel to a stop at the respective selected symbol number or position 24. The procedure of stepping the reels is then continued until all reels have reached their required indicia position and stopped, at which time the cycle is completed 25 causing a reel-stopped signal to be sent 26 to the main controller. The main controller holds information on the sequence of symbols on each reel strip, as illustrated in Figure 4, the number on the left of each symbol showing the number of steps required to step the reel from the index position to any given symbol number.

While the present invention has been described for poker machines having stepping motor driven reel displays, it will be recognised that video displays or any other display having the capability to display a selected symbol or indicia may equally make use of the invention as described.

Various methods may be used to select between the first and second tables, including the following:-

(a) fixed equal time periods for each table (or a fixed number of games to change over)

(b) equal time (or games) in each table, but choose table "A" or table "B" at random

(c) random time from one switching to the next (or random number of games)

Having two tables instead of one doubles the possibilities from which jackpots can be calculated. This scheme also offers other advantages not possible with a single table machine. By selecting between the tables,

the characteristics of the machine could be varied by providing more, frequently occurring, small pays in one table compared with another. However, more importantly, the return to the player can be controlled to be maintained within predetermined limits by the use of tables of unequal player return percentage, such as those illustrated in Figure 1 where table A has a theoretical return to the player of 80% and table B which has no jackpot but due to frequently occurring small pays gives a theoretical return to the player of 90%. If selection between tables A and B of figure 1 was truly random the machine would return an average 85% to the player even though there would be times when one or other of the tables would be chosen successively.

The time or number of games before changing from one table to the other will preferably be controlled by a plug-in circuit board or module, thereby allowing a manufacturer to send the same machine to markets requiring different percentages of revenue from machines without having to change combinations or artwork, nor re-write the program, simply by using different modules which provided different weightings to the selection of the first and second tables.

While poker machines can be designed to produce a particular long term return to the player with a corresponding dividend to the operator, over the short term returns and dividends can deviate somewhat from the theoretical. In order to overcome this difficulty, machines with two result tables can be adapted by altering the table selection criteria, such that the short term and long term return to the player and dividend to the operator are within well defined limits.

Referring to Fig. 5 the routine which operates to adjust the short term return can operate largely independently of the overall table selection routine to

alter the table selection when some adjustment to the return is required. This is achieved by continuously counting coins 100 inserted into the machine by a player and testing the number of coins inserted 101. When the number of coins inserted since the last return assessment is less than a predetermined number, control is returned to the normal table selection means 102. If on the other hand the predetermined number has been reached, the credit (winnings) count for the current accounting period is read 103 and compared with the total number of coins inserted over that period to determine the return percentage 104. If the return percentage is within acceptable limits about the target, control is returned to the normal table selection means 102. If the return percentage is not within these limits the return is compared with the target 105 to determine if the return is above or below target.

When the return is above target a test 106 is performed to determine which table is in use and if not table A (lower percentage) operation continues 107 with test 106 being performed after each operation to determine the table in use. When Table A is selected, operation continues until the signal to change to table B is issued at which time this signal is stored 108. Operation of the machine then continues 109 for a brief period (say 100 games) with Table A still used. After each game during the bias period a test 110 is performed to determine if the bias period is completed, and if not steps 109 and 110 are repeated. Once the bias period is completed, the switch to Table B which was blocked at step 108 is allowed to proceed 111. Control of the table selection is then transferred to the normal table selection means 102.

If at step 105 the return was found to be below the target return, steps 207-211 in Fig. 5 are performed instead of steps 107-111. Steps 207-211 are essentially identical to steps 107-111 which have been described,

except that the use of Tables A and B are swapped throughout the procedure.

It will be recognised by persons skilled in the art that numerous variations and modifications may be made to the invention as described above without departing from the spirit or scope of the invention as broadly described.

CLAIMS

1. A poker machine having display means arranged to simultaneously display a plurality of indicia selected from a set of possible indicia, the selected indicia representing a result of a game on said poker machine, the machine including random number generating means to produce one or more random or pseudo-random numbers and table look-up means arranged to look up a result table which maps said one or more random numbers to a selection from the set of indicia, the poker machine being characterised in that two result tables are provided, a first of said tables providing a set of possible results which give a theoretical return to the operator which is less than a predetermined target return of the machine and a second of the tables providing a set of possible results which give a theoretical return to the operator which is greater than said target return, and selection means being provided to periodically select one or other of the tables to be assessed by the table look-up means to maintain the actual return to the user within close limits about the target return.

2. A poker machine having display means arranged to simultaneously display a plurality of indicia selected from a set of possible indicia and random selection means arranged to select the indicia to be displayed on said display means from said set of indicia, the random selection means including random number generation means arranged to produce one random number for each indicia display position in the display means, a first look up table defining a first set of displayable indicia for each indicia display position, each indicia in the first table being associated with a respective random number within the range of random numbers able to be produced by the random number generator means, a second look up table defining a set of displayable indicia for each indicia

display position and each indicia of the second look-up table also being associated with a respective one of the possible numbers produced by the random number generator means, dividend monitoring means to continuously track the dividend returned to an oprator of the machine, and selection means arranged to select between the first and second look-up tables as the table to be used for a given game on the machine the first and second look up tables each producing different theoretical returns to the operator respectively higher and lower than a predetermined target return and the selection means being responsive to the dividend monitoring means to periodically select the first or second table in order to maintain the monitored dividend return with predefined limits about the target return.

Published 1989 at The Patent Office, State House, 66/71 High Holborn, London WC1R 4TP. Further copies may be obtained from The Patent Office. Sales Branch, St Mary Cray, Orpington, Kent BR5 3RD. Printed by Multiplex techniques ltd, St Mary Cray, Kent, Con. 1/87